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*VABILO NA PREDAVANJE
V OKVIRU DOKTORSKEGA ŠTUDIJA
KEMIJSKE ZNANOSTI*

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z naslovom:

**Spatio-temporal microbial single-cell analysis in
controlled picoliter reactors**

**v sredo, 31. 3. 2021 ob 15. uri,
preko spletnega orodja Zoom**
<https://uni-lj-si.zoom.us/j/98970208098>
(Meeting ID: 989 7020 8098)

Vljudno vabljeni!

Abstract:

Our understanding of large-scale bioprocesses is still dominated by an average cell approach in which the reactor is well stirred and all cells behave equally. However, the influence of single cell response to the micro environment, external disturbances or genetic stochasticity in production scale bioreactors is largely unknown. It is assumed that this reactor inhomogeneity and population heterogeneity negatively influences bioprocess scale up which remains a major hurdle in successful bioprocess development.

In this talk innovative microfluidic cultivation approaches in combination with time-lapse imaging suitable for high-throughput single-cell studies of microorganisms are presented. The device features several hundred picoliter sized growth chambers. Due to the chamber height of 1 μm , cell growth is restricted to a monolayer, ideal for time-lapse live cell microscopy. This microfluidic device enables the spatio temporal analysis of cell behaviour of micro populations down to single cell resolution with perfect environmental control. Furthermore, production studies with single-cell resolution can be performed utilizing genetically encoded fluorescence metabolite sensors. Exemplary applications of the picoliter bioreactor cultivation system will be presented with respect to single cell growth, substrate screening, amino acid production and population heterogeneity. The results demonstrate that microfluidics for single-cell analysis can be powerful tools to improve our fundamental understanding of population heterogeneity and impact of environmental inhomogeneity.